9 NOISE

This chapter summarizes existing noise conditions in the project vicinity, and provides an analysis of impacts of the proposed project on noise levels. Mitigation measures are recommended as necessary to reduce significant and potentially significant impacts of the proposed mine expansion project.

9.1 EXISTING CONDITIONS

This section provides a description of acoustic fundamentals, applicable noise regulations, and the existing noise environment surrounding the Patterson Sand and Gravel mine and the town of Sheridan.

ACOUSTIC FUNDAMENTALS

Noise is generally defined as sound that is loud, unpleasant, unexpected, or disagreeable. Sound is mechanical energy transmitted through a medium (air) in the form of a wave as a result of a disturbance or vibration.

SOUND PROPERTIES

A sound wave is introduced into a medium by a vibrating object. The vibrating object is the source of a disturbance that moves through the medium. The vibrating object that creates the disturbance could be a person's vocal cords, the vibrating string and sound board of a guitar or violin, or the vibrating diaphragm of a radio speaker. Regardless of what vibrating object is creating the sound wave, the particles of the medium through which the sound moves are vibrating in a back-and-forth motion at a given frequency (pitch). The frequency of a wave refers to how often the particles vibrate when a wave passes through the medium. The frequency of a wave is measured as the number of complete back-and-forth vibrations of a particle per unit of time. If a particle of air undergoes 1,000 longitudinal vibrations in 2 seconds, then the frequency of the wave would be 500 vibrations per second. A commonly used unit for frequency is the Hertz (Hz).

As a sound wave moves through a medium, each particle of the medium vibrates at the same frequency. The first particle of the medium begins vibrating at, for example, 500 Hz, and begins to set the second particle into motion at the same frequency, in this case 500 Hz. The second particle begins vibrating at 500 Hz and thus sets the third particle of the medium into motion at 500 Hz. The process continues throughout the medium. Hence, the frequency at which each particle vibrates is the same as the frequency of the original source of the sound wave. Subsequently, a guitar string vibrating at 500 Hz will set the air particles in the room vibrating at the same frequency of 500 Hz, which carries a sound signal to the ear of a listener that is detected as a 500 Hz sound wave.

The back-and-forth vibration motion of the particles of the medium would not be the only observable phenomenon occurring at a given frequency. Because a sound wave is a pressure wave, a detector could be used to detect oscillations in pressure from high pressure to low pressure and back to high pressure. As the compression (high-pressure) and rarefaction (low-pressure) disturbances move through the medium, they would reach the detector at a given frequency. For example, a compression would reach the detector 500 times per second if the frequency of the wave were 500 Hz. Similarly, a rarefaction would reach the detector 500 times per second if the frequency of the wave were 500 Hz. Thus, the frequency of a sound wave refers not only to the number of back-and-forth vibrations of the particles per unit of time, but also to the number of compression or rarefaction disturbances that pass a given point per unit of time. A detector could be used to detect the frequency of these pressure oscillations over a given period of time. The period of the sound wave can be found by measuring the time between successive high-pressure points (corresponding to the compressions) or the time between successive low-pressure points (corresponding to the rarefactions). The frequency is simply the reciprocal of the period; thus, as frequency increases, the period decreases and vice versa.

As mentioned previously, a wave is an energy transport phenomenon that transports energy along a medium. The amount of energy carried by a wave is related to the amplitude (loudness) of the wave. A high-energy wave is characterized by high amplitude; a low-energy wave is characterized by low amplitude. The amplitude of a wave refers to the maximum amount of displacement of a particle on the medium from its rest position. The energy transported by a wave is directly proportional to the square of the amplitude of the wave. This means that a doubling of the amplitude of a wave is indicative of a quadrupling of the energy transported by the wave. A tripling of the amplitude of a wave is indicative of a nine-fold increase in the amount of energy transported by the wave.

SOUND AND THE HUMAN EAR

Because of the ability of the human ear to detect a wide range of sound pressure fluctuations, sound pressure levels are expressed in logarithmic units called decibels (dB). The sound pressure level in decibels is calculated by taking the log of the ratio between the actual sound pressure and the reference sound pressure squared. The reference sound pressure is considered the absolute hearing threshold (Caltrans 1998).

In addition, because the human ear is not equally sensitive to all sound frequencies, a specific frequency-dependent rating scale was devised to relate noise to human sensitivity. An A-weighted decibel (dBA) scale performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear. The basis for compensation is the faintest sound audible to the average ear at the frequency of maximum sensitivity. This dBA scale has been chosen by most authorities for purposes of environmental noise regulation. Typical indoor and outdoor noise levels are presented in Exhibit 9-1. As indicated, typical sounds range from 40 dBA (very quiet) to 100 dBA (very loud). Conversation is roughly 60 dBA at 3–5 feet. As background noise levels exceed 60 dBA, speech intelligibility becomes increasingly difficult. Noise becomes physically discomforting at 110 dBA.

SOUND PROPAGATION

As sound (noise) propagates from the source to the receptor, the attenuation, or manner of noise reduction in relation to distance, is dependent upon such factors as the inverse square law, surface characteristics, atmospheric conditions, and the presence of physical barriers. The inverse square law

Exhibit 9-1 Typical Indoor and Outdoor Noise Levels describes the attenuation resulting from the pattern in which sound travels from the source to receptor. Sound travels uniformly outward from a point source in a spherical pattern with an attenuation rate of 6 dBA per doubling of distance (dBA/DD).

However, from a line source (roadway), sound travels uniformly outward in a cylindrical pattern with an attenuation rate of 3 dBA/DD. The surface characteristics between the source and receptor may result in additional sound absorption and/or reflection. In addition, atmospheric conditions such as wind speed, temperature, and humidity may affect noise levels. Furthermore, the presence of a barrier between the source and receptor may also attenuate noise levels. The actual amount of attenuation is dependent upon the barrier size and noise frequency. A noise barrier may be any natural or human-made feature such as a hill, tree, building, wall, or berm (Caltrans 1998).

Atmospheric Effects

Atmospheric conditions such as wind speed, temperature, and humidity may affect noise levels as discussed in detail below (Caltrans 1998).

Wind. The effects of wind on noise are mostly confined to noise paths close to the ground because of the wind shear phenomenon. Wind shear is caused by the slowing of wind near the ground because of friction. As the surface roughness of the ground increases, so does the friction between the ground and the air moving over it. As the wind slows near the ground, a sound velocity gradient is created because of differential movement of air with respect to the ground. This velocity gradient tends to bend sound waves downward in the same direction of the wind and upward in the opposite direction. The process, called refraction, creates a noise shadow (reduction) downwind of the source. In addition, wind may also result in a rumble because of friction between the air and the microphone of a sound level meter and result in contamination of noise measurements.

Temperature Gradients. In the troposphere, air temperature normally decreases with height above the ground according to the lapse rate, which is -1 degree Celsius (°C) per 100 meters (approximately 330 feet) for dry air. Because the speed of sound decreases as air temperature decreases, the resulting temperature gradient creates a sound velocity gradient with height. Slower speeds of sound higher above the ground tend to refract sound waves upward in the same manner as wind shear does upwind of the source. The result is a decrease in noise. Under certain stable atmospheric conditions, however, temperature profiles are inverted; in other wards, temperature increases with height. The inversion results in speeds of sound that temporally increase with altitude, causing noise refraction similar to that caused by wind shear downwind of a noise source. Inversions can affect noise propagation, resulting in less-than-normal attenuation rates and thus increased noise. The effects of vertical temperature gradients are more important over longer distances.

Temperature and Humidity. Molecular absorption in the air also reduces noise levels with distance. Although this process only accounts for about 1 dBA per 300 meters (1,000 feet) under average conditions with respect to traffic noise, the process may cause significant longer range effects. Air temperature and humidity affect molecular absorption differently depending on the frequency spectrum and vary significantly over long distances in a complex manner.

Rain. With respect to traffic noise, wet pavement results in an increase in tire noise and a corresponding increase in frequencies of noise at the source. Because the propagation of noise is frequency dependent, rain may also affect distance attenuation rates. On the other hand, traffic generally slows down during rain, decreasing noise levels and lowering frequencies. Various types of pavement interact with tires differently when wet than when dry. Furthermore, noise measurements should not be conducted during rainy conditions.

NOISE DESCRIPTORS

The selection of a proper noise descriptor for a specific source is dependent upon the spatial and temporal distribution, duration, and fluctuation of the noise. The noise descriptors most often encountered when dealing with traffic, community, and environmental noise are defined below (Caltrans 1998, FTA 1995, Lipscomb and Taylor 1978).

- L_{max} (maximum noise level): The maximum instantaneous noise level during a specific period of time. The L_{max} may also be referred to as the "peak (noise) level."

- L_X (statistical descriptor): The noise level exceeded X percent of a specific period of time.

- L_{eq} (equivalent noise level): The energy mean noise level. The instantaneous noise levels during a specific period of time, in dBA, are converted to relative energy values. From the sum of the relative energy values, an average energy value is calculated, which is then converted to dBA to determine the L_{eq}.

- L_{dn} (day-night noise level): The 24-hour L_{eq} with a 10 dBA "penalty" for the noise-sensitive hours between 10 p.m. and 6 a.m. The L_{dn} attempts to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.

- CNEL (community noise equivalent level): A descriptor similar to the L_{dn} described above, but with an additional 4.77 dBA "penalty" for the noise-sensitive hours between 7 p.m. to 10 p.m., which are typically reserved for relaxation, conversation, reading, and television. If using the same 24-hour noise data, the CNEL is typically approximately 0.5 dBA higher than the L_{dn}.

- SEL (single event [impulsive] noise level): A descriptor of a receiver's cumulative noise exposure from a single impulsive noise event, which is defined as an acoustical event of short duration (0.5 second) and involves a change in sound pressure above some reference value (approximately 40 dB).

NEGATIVE EFFECTS OF NOISE ON HUMANS

Negative effects of noise exposure include physical damage to the human auditory system, interference, and disease. Exposure to noise may result in physical damage to the auditory system, which may lead to gradual or traumatic hearing loss. Gradual hearing loss results from sustained exposure to moderately high noise levels over a period of time, while traumatic hearing loss is caused by sudden exposure to extremely high noise levels over a short period. However, gradual and traumatic hearing loss both may result in permanent hearing damage. In addition, noise may interfere with or interrupt sleep, relaxation, recreation, and communication. Although most interference may be classified as annoying, the inability to hear a warning signal may be considered dangerous. Noise may also be a contributor to diseases associated with stress, such as hypertension, anxiety, and heart disease. The degree to which noise contributes to such diseases depends on the noise frequency, bandwidth, level, and exposure time (Caltrans 1998).

EXISTING NOISE ENVIRONMENT

NOISE-SENSITIVE RECEPTORS

Noise-sensitive receptors located within the vicinity of the proposed project consist of 18 single-family residential units to the south, east, north, southwest, and southeast of the Patterson Sand and Gravel mine, primarily along Camp Far West Road. Exhibit 9-2 identifies the location of each single-family residential unit relative to the proposed expansion area, the existing operational area, and the proposed asphalt batch plant. Single-family residential units are located as close as approximately 320 feet south of the proposed expansion area (Phase 6), 1,200 feet east of the existing processing area, and 2,160 feet southeast of the proposed asphalt batch plant.

Within Sheridan, noise-sensitive receptors located along the existing haul route consist primarily of single-family residential units. Sheridan Elementary School is located approximately 525 feet north of the existing haul route. Major noise-sensitive land uses located within Sheridan are shown in Exhibit 9-3.

NOISE SOURCES

Existing noise sources associated with the Patterson Sand and Gravel mine include mining, processing, and reclamation operations. The existing mining operations involve initial pit development, which entails surface grading, clearing, excavating, mining, and material loading. Equipment typically used during normal daily operations, including both mining and reclamation activities, is listed in Table 2-1 in Chapter 2, Project Description, of this EIR. Noise associated with mining and material handling within the mining pit area, as perceived at nearby residences, tends to be greatest during initial implementation of mining activities and gradually decreases over time because of the soil barrier that is created as the mining pit depth increases.

The primary noise sources associated with the existing processing operations include wash plant #1, wash plant #2, and the crusher plant, which require vibrating screens and conveyors. In addition, haul trucks associated with material transportation are also a primary noise source.

Noise sources along the haul route and within Sheridan are associated primarily with vehicle traffic. Within Sheridan, vehicle traffic on SR 65, as well as haul truck traffic on Riosa Road, are the primary

Exhibit 9-2 Noise Survey and Sensitive Receptor Locations (Project Site)
11x17

11x17 second page

Exhibit 9-3 Noise Survey and Sensitive Receptor Locations (Sheridan)
11x17

11x17 second page

sources of existing vehicle noise. Additional sources of noise within Sheridan include an occasional train pass-by and/or aircraft overflight.

AMBIENT NOISE SURVEYS

Ambient noise surveys were conducted in 2001, 2002, and 2004 for the purpose of documenting and measuring the existing noise environment at locations representative of the sensitive receptors. In July and August 2001, a total of five long-term (24-hour) noise level measurements were conducted: four near the sensitive receptors (residences) located within the vicinity of the proposed expansion area, existing operational area, and proposed asphalt batch plant; and one near the sensitive receptors (residences) located along the existing haul route (see Table 9-1 and Appendix D). In January and February 2004, additional short-term (15- to 30-minute) measurements were conducted near residences in the project vicinity (see Table 9-1 and Appendix E). Exhibits 9-2 and 9-3 identify these ambient noise survey locations. In August 2002 and February 2004, more short-term noise level measurements were conducted near the existing operational area specifically to document and measure noise levels associated with onsite stationary equipment (see Appendix E). Ambient noise levels and sources contributing to the measured noise levels in the vicinity of the Patterson Sand and Gravel mine and along the existing haul route within Sheridan are discussed separately below.

Ambient Noise Levels in the Vicinity of the Patterson Sand and Gravel Mine

As discussed above, long- and short-term ambient noise surveys were conducted within the vicinity of the existing operational area at nearby noise-sensitive receptors during time periods when the wash plants and/or crusher plant were operating and haul truck traffic was present on local roadways. Ambient noise sources noted during the surveys were the existing Patterson Sand and Gravel operations; vehicular traffic on county roads such as Camp Far West Road, Porter Road, and Karchner Road; farm operations; and occasional aircraft overflight. The noise levels measured at each ambient noise survey location are presented in Table 9-1 and Appendix E. Based on the measurements conducted, daytime ambient noise levels within the vicinity of the Patterson Sand and Gravel mine ranged from approximately 47.9 to 59 dBA L_{eq}, and nighttime levels from 32.1 to 42.6 L_{eq}, dependent primarily on distance from the receptor to the major sources of noise (e.g., the mine or vehicle traffic on area roadways), as presented in Table 9-1 and Appendix E.

Additional short-term measurements were conducted in 2002 near the existing operational area during time periods when the plants were in full operation. The L_{eq} values are presented along with other descriptive information in Appendix E. The purpose of these short-term surveys was to measure and document the noise associated with onsite stationary and mobile equipment. These measurements were also used to create the existing noise contours associated with the operation of onsite stationary equipment (Exhibit 9-4). The contours are based on direct interpolation from the noise level measurements. Duplicate measurements were conducted in 2003 to verify the accuracy of these measurements for which the contours and predictive noise levels were derived.

Table 9-1
Ambient Noise Survey Measurements

Measurements in the Vicinity of the Patterson Sand and Gravel Mine

Location[1]		Monitoring Time/Date and Duration	Noise Levels (dBA)[2]			
Site #	Description		L_{eq}[3]	L_{max}	L_{min}	CNEL/ L_{dn}
1	Approximately 2,590 feet northeast of existing processing area (near receptor #1)	Start: 12 noon/July 2, 2001 Stop: 12 noon/July 3, 2001 Duration: 24 hours	47.9	74.7	27.1	48.3/ 47.8
		Start: 10:45 a.m./February 5, 2004 Stop: 11 a.m./February 5, 2004 Duration: 15 minutes	41.9	52.3	36.2	-
2	Approximately 4,030 feet southwest of existing processing area (near receptor #2)	Start: 12 noon/July 5, 2001 Stop: 12 noon/July 6, 2001 Duration: 24 hours	51.4	70.6	29.9	53.0/ 52.8
		Start: 9:40 a.m./January 6, 2004 Stop: 10:10 a.m./January 6, 2004 Duration: 30 minutes	45.9	65.0	35.3	-
3	Approximately 990 feet east of existing processing area (near receptor #3)	Start: 3 p.m./July 9, 2001 Stop: 3 p.m./July 10, 2001 Duration: 24 hours	57.5	79.3	32.2	55.0/ 54.5
		Start: 11:30 a.m./February 5, 2004 Stop: 11:45 a.m./February 5, 2004 Duration: 15 minutes	54.8	59.2	51.0	-
4	Approximately 1,540 feet south of existing processing area (near receptor #4)	Start: 4 p.m./July 10, 2001 Stop: 4 p.m./July 11, 2001 Duration: 24 hours	52.6	70.5	32.5	54.1/ 54.0
		Start: 11:05 a.m./January 6, 2004 Stop: 11:35 a.m./January 6, 2004 Duration: 30 minutes	58.3	72.0	43.1	-
5	East corner of Camp Far West Road and the entrance road intersection (near receptor #5)	Start: 10:15 a.m./January 6, 2004 Stop: 10:45 a.m./January 6, 2004 Duration: 30 minutes	58.3	71.5	41.9	-
		Start: 9:35 a.m./February 5, 2004 Stop: 9:50 a.m./February 5, 2004 Duration: 15 minutes	58.6	70.5	49.8	-
6	Approximately 3,760 feet northeast of existing processing area (near receptor #8)	Start: 9:30 a.m./January 6, 2004 Stop: 10:00 a.m./January 6, 2004 Duration: 30 minutes	46.3	62.8	40.0	-
		Start: 11:05 a.m./February 5, 2004 Stop: 11:20 a.m./February 5, 2004 Duration: 15 minutes	44.2	57.2	39.9	-

Table 9-1 Ambient Noise Survey Measurements						
7	Approximately 4,850 feet north of existing processing area (near receptor #9)	Start: 12:15 p.m./January 6, 2004 Stop: 12:45 p.m./January 6, 2004 Duration: 30 minutes	37.8	43.9	35.1	-
		Start: 12 noon/February 5, 2004 Stop: 12:15 p.m./February 5, 2004 Duration: 15 minutes	38.4	56.5	31.5	-
8	Approximately 6,770 feet southwest of existing processing area (near receptor #14)	Start: 8:20 a.m./January 6, 2004 Stop: 8:50 a.m./January 6, 2004 Duration: 30 minutes	59.0	79.2	38.3	-
9	Approximately 11,760 feet east of existing processing area (near receptor #18, Wheatland Ranch)	Start: 1:50 p.m./February 13, 2004 Stop: 2:05 p.m./February 13, 2004 Duration: 15 minutes	43.0	60.5	34.7	-
Measurements in Sheridan						
Location [4]		Monitoring Time/Date	Noise Levels (dBA) [2]			
Site #	Description		L_{eq} [3]	L_{max}	L_{min}	CNEL/ L_{dn}
1	Northeast corner of the Riosa Road/11th Street intersection	Start: 4 p.m./July 25, 2001 Stop: 4 p.m./July 26, 2001 Duration: 24 hours	69.0	93.9	36.4	68.2/ 68.1

1 Refer to Exhibit 9-2.

2 Noise level measurements were recorded using a Larson Davis Model 820 Type 1 integrating sound level meter positioned approximately 4.5 feet above ground level. See Appendix E for description of plant operations occurring during periods of measurement.

3 For long-term 24-hour measurements this is the maximum 1-hour L_{eq} measured during the 24-hour period.

4 Refer to Exhibit 9-3.

Refer to Appendix E for ambient noise survey data.

Source: EDAW 2004

As mentioned previously, vehicle traffic is a primary noise source for residences located in the vicinity of the Patterson Sand and Gravel mine. Haul trucks on local county roads are a major contributor to traffic noise levels. In general, noise generated by heavy-duty haul trucks is typically a composite of four vehicle noise sources: tire-to-pavement contact, the application of brakes, engine noise, and exhaust noise. Noise associated with the application of brakes, and increases in exhaust noise caused by acceleration, are of particular concern. This is especially the case near traffic stops, yields, and/or curves in the road that occur within the vicinity of noise-sensitive receptors and that require the trucks to slow down. An example of this is when haul trucks slow down as they merge from Porter Road onto Camp Far West Road in close proximity to residences.

Exhibit 9-4 Existing Onsite Stationary Source Noise Levels

Existing roadway traffic noise levels were calculated for various roadway segments near the mine using the Federal Highway Administration (FHWA) Traffic Noise Prediction Model (FHWA 1988). (FHWA procedures for abatement of highway traffic noise are described in Section 9.2 below.) Input variables such as daily traffic volumes, traffic distribution characteristics, vehicle speeds, ground attenuation factors, and roadway widths were based on information from the traffic report prepared for this project, Caltrans, and model settings. Table 9-2 presents the modeled existing traffic noise levels 50 feet from the centerline of the nearest travel lane for county roads in the vicinity of the mine.

Table 9-2
Existing Traffic Noise Levels

Roadway Segment	L_{dn}/CNEL 50 Feet From Nearest Travel Lane Centerline (dB)[1]
Riosa Road East of Andressen Road Intersection	64.17
Riosa Road West of Andressen Road Intersection (Downtown Sheridan)	64.29
Karchner Road Between Porter and Riosa Road	64.01
Camp Far West Road Between Patterson Sand and Gravel Entrance and Porter Road Intersection	64.03
SR 65 North of Riosa Road Intersection	74.62
SR 65 South of Riosa Road Intersection	74.55
SR 65 North of SR 193 Intersection	77.00
SR 65 South of SR 193 Intersection	77.69

[1] Existing traffic noise levels were calculated using the FHWA Traffic Noise Prediction Model computer program (FHWA 1988). Input variables such as daily traffic volumes, traffic distribution characteristics, vehicle speeds, ground attenuation factors, and roadway widths were based on information from the traffic report prepared for this project, Caltrans, and model settings.

Traffic modeling results are presented in Appendix E.

Sources: DKS Associates 2004, EDAW 2004

Ambient Noise Levels in Sheridan

The primary noise source in Sheridan is vehicle traffic on Riosa Road and SR 65. To document existing noise levels, a long-term (24-hour) ambient noise survey was conducted along the existing haul route within Sheridan. Ambient hourly noise levels at the Riosa Road/11th Street intersection (refer to monitoring site number 1, Exhibit 9-3), ranged from approximately 69 dBA L_{eq} (see Table 9-1 for daytime 1-hour L_{eq}) during the daytime hours to approximately 52.3 dBA L_{eq} (1-hour) during the nighttime hours (see Appendix E for nighttime 1-hour L_{eq}). The average daily noise level was approximately 68 dBA CNEL (Table 9-1). Daytime ambient noise levels at this location were influenced primarily by heavy-duty haul truck traffic on Riosa Road. The maximum noise levels measured at this location were approximately 93.9 dBA (L_{max}) because of the use of haul truck brakes, as well as increases in exhaust and engine noise.

Existing roadway traffic noise levels were calculated for various roadway segments in Sheridan using the FHWA Traffic Noise Prediction Model (FHWA 1988). Input variables such as daily traffic volumes, traffic distribution characteristics, vehicle speeds, ground attenuation factors, and roadway widths were based on information from the traffic report prepared for this project, Caltrans, and model settings. Table 9-2 presents the modeled existing traffic noise levels 50 feet from the centerline of the nearest travel lane for roads in Sheridan.

9.2 REGULATORY BACKGROUND

Federal, state, and local governments and other entities have implemented a variety of standards and guidelines related to noise levels. The applicable standards and guidelines for the proposed mine expansion project are discussed below.

FEDERAL HIGHWAY ADMINISTRATION PROCEDURES

The FHWA has adopted procedures for the abatement of highway traffic noise, as codified in 23 CFR 772. These procedures, which have also been adopted by Caltrans, contain noise abatement criteria with respect to specific land uses. According to these procedures, traffic noise impacts are identified when predicted traffic noise levels approach or exceed the criteria summarized in Table 9-3.

Table 9-3
Noise Abatement Criteria

Activity Category	Hourly L_{eq} (dBA)	Description of Activity Category
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (exterior)	Developed lands, properties, or activities not included in Categories A or above.
D	--	Undeveloped lands.
E	52 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: FHWA 1995

STATE OF CALIFORNIA NOISE STANDARDS

The State of California has adopted noise standards in areas of regulation not preempted by the federal government. State standards regulate noise levels of motor vehicles and freeway noise affecting classrooms, set standards for sound transmission control and occupational noise control, and identify noise insulation standards. The state has also developed land use compatibility guidelines for community noise environments.

The *State of California General Plan Guidelines*, published by the Governor's Office of Planning and Research (OPR), provides guidance for the acceptability of projects within specific CNEL/L_{dn} contours. Generally, residential uses are considered to be acceptable in areas where exterior noise levels do not exceed 60 dBA CNEL/L_{dn}. Residential uses are normally unacceptable in areas exceeding 70 dBA L_{dn} and conditionally acceptable within 60–70 dBA L_{dn}. Schools, libraries, churches, hospitals, and nursing homes are treated as noise-sensitive land uses requiring acoustical studies within areas exceeding 60 dBA L_{dn}. Additionally, 45 dBA L_{dn} is prescribed as a suitable interior noise environment for noise-sensitive uses. However, the state stresses that these guidelines can be modified to reflect sensitivities of individual communities to noise.

PLACER COUNTY NOISE REGULATIONS

PLACER COUNTY NOISE ORDINANCE

The Placer County Board of Supervisors approved a new county noise ordinance in December 2003 (Placer County 2003). The following exceptions and standards are applicable.

9.36.030 Exemptions

Sound or noise emanating from the following sources and activities are exempt:

- Construction (e.g., construction, alteration, or repair activities) between the hours of six (6) a.m. and eight (8) p.m. Monday through Friday, and between the hours of eight (8) a.m. and eight (8) p.m. Saturday and Sunday are exempt. Provided, however, that all construction equipment shall be fitted with factory installed muffling devices and that all construction equipment shall be maintained in good working order.

- Sound sources associated with agricultural operations on agricultural land, as defined by the Placer County Code Chapter 5, Article 5.24.040, which are carried out in any manner consistent with the practice and within the standards of the agricultural industry are exempt. This includes without limitation all mechanical devices, apparatus, or equipment utilized for the protection or salvage of agricultural crops during periods of adverse weather conditions or when the use of mobile sources is necessary for pest control.

- Safety, warning, and alarm devices, including house and car alarms, and other warning devices that are designed to protect the health, safety, and welfare are exempt, provided such devices not negligently maintained or operated.

9.36.060 Sound limits for sensitive receptors

It is unlawful for any person at any location to create sound, or to allow the creation of any sound, on property owned, leased, occupied, or otherwise controlled by such person that:

– Causes the exterior sound level when measured at the property line of any affected sensitive receptor to exceed the ambient sound level by five (5) dBA or

– Exceeds 55 dBA (hourly L_{eq})/70 dBA (L_{max}) during the daytime (7 a.m. to 10 p.m.) or 45 dBA (hourly L_{eq})/65 dBA (L_{max}) during the nighttime (10 p.m. to 7 a.m.), whichever is the greater.

Each of the sound level standards specified above shall be reduced by five (5) dB for simple tone noises, consisting of speech and music. However, in no case shall the sound level standard be lower that the ambient sound level plus five (5) dB.

If the intruding sound source is continuous and cannot be reasonably be discontinued or stopped for a time period whereby the ambient sound level can be measured, the sound level measured while the source is in operation shall be compared directly to the sound level standards specified above.

PLACER COUNTY GENERAL PLAN

Nontransportation Noise Sources

Placer County has adopted a Noise Element in its General Plan (Placer County 1994). The Noise Element identifies maximum allowable L_{dn} noise levels applicable to new projects affected by or including nontransportation noise sources. Residential uses normally are allowed in areas with noise levels of 50 dBA L_{dn} or lower. However, residential uses adjacent to industrial uses are allowed to have noise levels of up to 60 dBA L_{dn} because noise from industrial operations may be difficult to mitigate in a cost-effective manner.

The Placer County Noise Element also provides that noise level standards applicable to land uses containing incidental residential uses, such as caretaker dwellings at industrial facilities and homes on agriculturally zoned land, shall be the standards applicable to the zone district, not those applicable to residential uses. In areas zoned for limited industrial or industrial park, the allowable noise level is 75 dBA L_{dn}. Areas zoned for farming or agriculture-exclusive uses are not considered noise sensitive. In assessing the effects of agricultural noise upon residences located in the agricultural zones, an L_{dn} of 70 dBA is considered an acceptable outdoor exposure.

In addition to the above General Plan noise criteria, Placer County also recommends evaluation of average hourly exterior noise levels when evaluating the compatibility of non-transportation noise sources with surrounding land uses. In accordance with these criteria, non-transportation operational noise levels are generally considered compatible if hourly exterior noise levels at nearby noise-sensitive receptors do not exceed 60 dBA L_{eq} during the daytime hours or 50 dBA L_{eq} during the nighttime hours. When averaged over a 24-hour period, these hourly noise criteria are essentially equivalent to the General Plan average daily land use compatibility noise standard of 60 dBA L_{dn}. Placer County limits construction activities to daytime hours between 7 a.m. and 7 p.m., Monday through Friday. No maximum noise level limit has been set for construction activity.

New Transportation Noise Sources

Placer County sets the maximum allowable noise exposure from transportation noise sources to 60 dBA L_{dn} in outdoor activity areas and 45 dBA L_{dn} in interior noise-sensitive spaces for residential uses, transient lodging, hospitals, nursing homes, churches, and meeting halls. Playgrounds and neighborhood parks are allowed in areas with outdoor noise levels up to 70 dBA L_{dn}.

YUBA COUNTY NOISE REGULATIONS

Yuba County has established maximum permissible sound levels for sound that emanates from stationary sources. These maximum levels are based on the zoning district of the receiving property. The maximum permissible noise levels for residential land uses are summarized in Table 9-4.

Table 9-4
Yuba County Noise Standards

Zone District	Time Period	Maximum Noise Level Permitted (dBA)
Single-Family Residential	10 p.m.–7 a.m. 7 p.m.–10 p.m. 7 a.m.–7 p.m.	55 60 65
Multi-Family Residential	10 p.m.–7 a.m. 7 a.m.–10 p.m.	60 65
Commercial—BP	10 p.m.–7 a.m.	65
Commercial	7 a.m.–10 p.m.	70
M1	Any time	75
M2	Any time	80
Agricultural	Any time	50

Source: Yuba County Noise Regulations, Chapter 8.20

OTHER NOISE RELATED REGULATIONS AND CRITERIA

WORLD HEALTH ORGANIZATION GUIDELINES

Since 1980, the World Health Organization (WHO) has addressed the problem of community noise. In 1992, the WHO Regional Office for Europe convened a task force meeting that set up guidelines for community noise. A preliminary publication of the Karolinska Institute, Stockholm, on behalf of WHO, appeared in 1995. The WHO has since finalized these guidelines and in 2000 published the *Guidelines for Community Noise*. The WHO-recommended noise values identified in the *Guidelines for Community Noise* are based on levels of noise that would ensure the protection of health (critical health effect) and minimize levels of annoyance.

The maximum allowable exterior noise levels recommended by the WHO for residential uses are 55 dBA L_{eq} and 45 dBA L_{eq} for daytime and nighttime hours, respectively. To avoid sleep disturbance during the more noise-sensitive nighttime hours, the WHO-recommended maximum exterior noise level at the facade of residential dwellings is 60 dB L_{max}. It is important to note that these are general guideline noise values. Maximum allowable noise levels may need to be reduced, depending on the nature of the noise source, as well as exterior-to-interior noise reduction building characteristics. For instance, because of the varying attenuation characteristics of building materials (e.g., wood siding, glass, brick) within the lower and upper frequency noise ranges, the WHO-recommended noise values may not be protective of noise events that occur primarily within the lower or upper frequency ranges of human detection (WHO 2000).

Community Ambient Noise Degradation

In addition to the criteria discussed above, another consideration in defining impact criteria is based on the degradation of the existing noise environment. A variety of reactions result from the exposure to noise, ranging from serious annoyance to no awareness. About 10 percent of the population is so sensitive to noise that it objects to any noise not of their own making. Thus, some complaints occur even in the quietest environments. Another sizable portion of the population (about 25 percent) does not react or complain even in very severe noise exposure. People can be expected to respond to changes in level as follows:

- Except in carefully controlled laboratory experiments, an increase or decrease of only 1 dBA is difficult to perceive.
- Outside of the laboratory, a 3-dBA increase or decrease is considered a noticeable difference.
- A 10-dBA increase is generally perceived as a doubling of loudness and would likely cause an adverse community reaction.

A noise impact is considered "generally not significant" if no noise-sensitive sites are located in the project area, or if increases in community noise level with implementation of the project are expected to be 3 dBA or less at noise-sensitive locations, and the proposed project will not result in violations of local ordinances or standards. Noise-sensitive sites include residences, motels, hotels, public meeting rooms, auditoriums, schools, churches, libraries, hospitals, amphitheaters, parks, and other areas where low noise levels are essential.

The "significance" of a change in noise levels is somewhat subjective. However, both Caltrans and the FHWA have published general criteria, applicable to roadway noise, that can also be used to define noise impacts associated with other community noise increases. In general, if the increase in noise exposure level is greater than 3 dBA, the significance of the impact will depend on the ambient noise level and the presence of noise-sensitive uses. Noise impacts can be considered "possibly significant" if increases in noise exposure levels are expected to be no greater than 3 dBA with implementation of the project. Noise impacts can be considered "generally significant" if a project causes noise standards or ordinances to be exceeded, or increases community noise levels by 6–10 dBA in urban areas, or increases noise levels by 10 dBA or more in rural areas. The Placer County Noise Ordinance recommends an increase of 5 dBA (Placer County 2003). For the purpose of this project, a more conservative increase of 3 dBA shall represent a significant increase in ambient noise levels.

9.3 ENVIRONMENTAL IMPACTS

As explained in Section 3.5, environmental impacts are defined by comparison to an appropriate baseline condition. For impacts that relate to changes in physical resources or the location of operations, the baseline is the existing setting at the time the latest NOP was released (early 2001). For impacts that relate to operational rates, such as the rate of production or the volume of truck traffic, the baseline is the highest rate season from 2000, the latest year when comprehensive data on operations and traffic are available and the second highest production rate year in the mine's history. This operational baseline is meant to serve as a reasonable representation of the practical capacity of the mine under its current permit, which is the baseline approach approved by the courts in previous relevant CEQA cases.

<u>THRESHOLDS OF SIGNIFICANCE</u>

The proposed project would have a significant impact related to noise if the proposed project would result in an increase in noise levels (in comparison to baseline conditions) that would cause the mining operation to exceed any of thresholds listed below.

- *Construction noise levels:* Exceedance of the applicable noise standard (55 dBA hourly L_{eq}/70 dBA L_{max} [7 a.m.–10 p.m.] or 45 dBA L_{eq}/65 dBA L_{max} during [10 p.m.–7 a.m.]) at residential land uses.
- *Operational traffic noise levels:* Result in a noticeable (3 dBA) increase in ambient noise levels that would exceed the applicable land use compatibility noise level criteria (60 dBA L_{dn} [exterior]/45dBA L_{dn} [interior]) at residential land uses.
- *Operational stationary source noise levels (Average Hourly):* Result in a noticeable (3 dBA) increase in ambient noise levels that would exceed recommended land use compatibility exterior noise criteria (60 dBA L_{eq} [7 a.m.–10 p.m.] or 50 dBA L_{eq} [10 p.m.–7 a.m.]) at residential land uses.
- *Operational single-event noise levels:* Exceedance of the County's maximum allowable noise standards (70 dBA L_{max} [7 a.m.–10 p.m.] or 65 dBA L_{max} [10 p.m.–7 a.m.])

PROJECT IMPACTS

Impact
9-1

***Short-term Construction Noise Levels Exceeding Permissible Limits**. Construction operations (onsite construction of an office building, an extended levee, and an asphalt batch plant) are not limited to the hours exempt from the permissible noise level limits set forth in the applicable noise standards (7 a.m.–7 p.m.), and construction noise could exceed permissible limits. Therefore, this impact is considered **potentially significant**.*

The proposed project includes the onsite construction of an office building, an extended levee, and an asphalt batch plant. The construction of each may include a site preparation phase that involves clearing, demolition, and excavation and subsequent foundation, erection, and finishing phases.

According to the U.S. Environmental Protection Agency (EPA), the noise levels of concern are typically associated with the site preparation phase because of the construction equipment associated with clearing and excavation, which range in noise levels from 79 to 91 dBA at a distance of 50 feet as indicated in Table 9-5. The simultaneous operation of the construction equipment associated with the project, as identified above, would be projected to result in noise levels of approximately 92.8 dBA at 50 feet from each of the proposed construction sites. Assuming a noise attenuation rate of 6 dBA, the exterior noise levels at the single-family residential units located within approximately 2,175 feet of construction activities would be approximately 60 dBA without feasible noise control.

Table 9-5
Typical Equipment Noise Levels

Type of Equipment	Noise Level in dBA at 50 feet	
	Without Noise Control	With Feasible Noise Control
Dozer or Tractor	80	75
Scraper	88	75
Front-End Loader	79	75
Backhoe	85	75
Grader	85	75
Truck	91	75

Feasible mitigation measures include use of exhaust and intake mufflers and engine shrouds, in accordance with manufacturers' specifications.

Source: EPA 1971, FTA 1995

According to the Noise Element of the Placer County General Plan, construction activities are limited to the daytime hours between 7 a.m. and 7 p.m., Monday through Friday. Also, the Placer County Noise Ordinance exempts construction noise that occurs between 6 a.m. and 8 p.m., Monday through Friday, and between 8 a.m. and 8 p.m., Saturday and Sunday. Thus, construction operations that occur between 7 a.m. and 7 p.m. Monday through Friday are allowed and exempt from the applicable standards. However, if construction operations were to occur during the more noise-sensitive hours, which are between 7 p.m. and 7 a.m., the applicable noise standards would be exceeded at the single-family residential units within the project vicinity. In addition, if construction operations were to occur during these noise-sensitive hours, resultant increases in ambient noise levels—including noise generated by onsite equipment use and vehicles traveling on nearby roadways—may potentially exceed 3 dBA for brief periods of time, which may result in annoyance and/or sleep disruption for occupants of the nearby residential dwellings. Because construction operations are not limited to the daytime hours exempt from the permissible noise level limits set forth in the applicable noise standards, this impact is considered potentially significant.

Impact
9-2

Operational Mining and Processing Noise Levels Exceeding Recommended Thresholds. *Predicted existing plus project onsite operational noise levels would result in an increase in noise levels in comparison to existing conditions and exceed the recommended thresholds. As a result, this impact is considered* ***significant.***

MINE PROCESSING AREA

Noise levels associated with the processing area include noise associated with the operation of the wash plants, the crusher plant, and onsite mobile equipment. Assuming simultaneous operation of all plants, hourly noise levels associated with processing activities typically average approximately 70 dBA at 275 feet (see Appendix E). Based on this noise level and assuming an average noise attenuation rate of 6 dBA per doubling of distance from the source, predicted maximum hourly operational noise levels associated with the mine processing area at the nearby residential dwellings would range from approximately 40 to 57.2 dBA L_{eq} (1-hour), depending on distance from the plant. It is important to note that these predicted operational noise levels are representative of noise typically generated by onsite operational activities and do not take into account reductions in noise levels because of intervening physical features or terrain, changes in meteorological conditions, or variations in onsite operational activities. As a result, actual noise levels at nearby noise-sensitive receptors will likely vary from one day to the next, depending on these variable conditions and other influences such as the receptors' proximity to other major noise sources (e.g., area roadways, active mining areas).

MINING AND RECLAMATION AREA

Noise levels associated with mining/reclamation activities would result in an increase in the ambient noise levels, which would be greatest during initial site preparation. The initial site development would be anticipated to require the equipment types identified in Table 2-1 (one dozer, one excavator, one scraper, one loader, and haul trucks) associated with clearing, grubbing, loading, transporting, and excavation operations. The proposed mining/reclamation operations are anticipated to occur over a 55-year period. Table 9-5 presents the typical noise levels associated with the proposed mining/reclamation equipment at 50 feet with and without feasible noise control such as mufflers (EPA 1971, FTA 1995). For instance, haul trucks typically result in a 91-dBA noise level at 50 feet without the installation of feasible noise controls. Predicted maximum hourly operational noise levels associated with the mining/reclamation activities at the nearby residential dwellings would range from approximately 57 to 80 dBA L_{eq} (1-hour), depending on distance from the nearest phase (see Appendix E). After the initial site development and preparation of each mining area, the mine pit slopes would serve as noise barriers to reduce equipment noise levels at the sensitive receptors. As a result, predicted equipment noise levels, as perceived at the nearest receptor, would be anticipated to decrease as the depth of the mining pits increase.

PROPOSED ASPHALT BATCH PLANT

The operation of the proposed asphalt batch plant would result in noise levels of approximately 64 dBA L_{eq} (1-hour) at a distance of 200 feet with a 60 dBA L_{eq} noise contour at approximately 300 feet from the proposed plant location. The sensitive receptors, which consist of single-family residential dwellings located within proximity of the proposed project area, are located approximately 2,160–11,600 feet from the proposed batch plant site (Exhibit 9-2). Assuming a noise attenuation rate of 6 dBA per doubling of distance from the source, the operation of the proposed batch plant would result in noise levels of less than 45 dBA L_{eq} (1-hour) at the nearest residential dwelling. Consequently, because of the magnitude of the existing processing area noise levels, as well as predicted mining equipment noise levels, the proposed asphalt batch plant would not result in a noticeable increase in the ambient noise level at the sensitive receptors, under most conditions.

COMBINED OPERATIONAL NOISE LEVELS

Stationary Sources

Exhibit 9-5 displays the predicted L_{eq} noise contours for existing plus project onsite stationary-source noise levels, which includes the existing processing plants in addition to the proposed asphalt batch plant. Based on these noise levels and assuming an average noise attenuation rate of 6 dBA/DD, predicted maximum hourly operational noise levels associated with onsite stationary equipment at the nearby residential dwellings would range from approximately 38 to 57 dBA L_{eq} (see Appendix E). The predicted noise levels do not account for additional reductions in noise levels because of changes in meteorological conditions, intervening physical features, or terrain, except for the berm that is located west of the existing processing area. Based on the analysis conducted, predicted operational stationary source noise levels at nearby receptors would not exceed the County-recommended threshold of 60 dBA L_{eq} during the daytime hours. However, stationary source noise levels during the nighttime hours (i.e., 10 p.m. to 7 a.m.) would exceed the County's recommended hourly noise level of 50 dBA L_{eq}. However, even though noise levels exceed the recommended thresholds, plus project conditions (which include the proposed asphalt batch plant) would not result in a noticeable increase (i.e., 3 dBA or greater) in comparison to existing conditions at the nearby sensitive receptors.

Stationary and Mobile Sources

Table 9-6 presents the predicted onsite (stationary and mobile equipment) operational noise levels for both baseline and proposed project conditions. Predicted noise levels were calculated based on the estimated distance from the existing processing plant, proposed asphalt batch plant, and nearest mining areas. The predicted noise levels do not account for additional reductions in noise levels caused by changes in meteorological conditions, or intervening physical features or terrain, except for the berm that is currently located to the west of the existing processing area.

Exhibit 9-5 Existing Plus Project Onsite Stationary Source Noise Levels

Table 9-6 Predicted Operational Noise Levels							
Land Use (see Exhibit 9-2)		Distance From Source to Receptor (Feet)			Predicted Noise Level (dBA L_{eq}) [1]		Significant Increase?[2]
		Processing Area	Nearest Mining Phase	Asphalt Batch Plant	Baseline	With Project	
1	Residential	3,130	3,400 (Phase 6)	4,350	84.62	60.40	NO
2	Residential	5,670	3,380 (Phase 5)	4,930	50.40	60.23	YES
3	Residential	1,200	870 (Phase 6)	2,370	59.17	72.05	YES
4	Residential	1,940	320 (Phase 6)	2,160	56.85	80.59	YES
5	Residential	1,660	560 (Phase 6)	2,320	58.27	75.76	YES
6	Residential	3,610	4,100 (Phase 6)	4,810	69.09	58.80	NO
7	Residential	4,680	4,800 (Phase 6)	5,860	56.35	57.37	NO
8	Residential	4,210	4,340 (Phase 3)	5,340	84.62	58.25	NO
9	Residential	5,280	3,800 (Phase 3)	6,230	58.76	59.25	NO
1	Residential	2,280	1,440 (Phase 6)	3,180	55.39	67.64	YES
1	Residential	3,370	1,670 (Phase 6)	3,500	51.84	66.31	YES
1	Residential	3,430	1,810 (Phase 6)	3,120	51.45	65.62	YES
1	Residential	7,150	4,680 (Phase 5)	6,230	46.90	57.42	YES
1	Residential	8,420	4,740 (Phase 5)	7,670	45.50	57.27	YES
1	Residential	8,960	4,080 (Phase 5)	8,240	45.23	58.54	YES
1	Residential	9,570	4,780 (Phase 5)	8,780	44.28	57.18	YES
1	Residential	9,830	4,550 (Phase 5)	8,990	44.07	57.60	YES
1	Residential	12,000	5,130 (Phase 4)	11,600	41.23	56.54	YES
Significance Threshold:					**60**	**60/50** [3]	

[1] Based on distance from nearest source(s) to receptor. Refer to Appendix E for modeling assumptions and results.

[2] Significance increase is defined as a noticeable increase (i.e., 3 dBA or greater) in ambient noise levels in comparison to baseline conditions.

[3] Based on Placer County's recommended daytime (7am-10pm)/nighttime (10pm-7am) noise level criteria for land use compatibility.

Source: EDAW 2004

Based on the modeling conducted, the primary noise sources affecting the nearby land uses are associated with the operation of mobile equipment within the mineral extraction areas. Mining activities are proposed to occur between the hours of 6 a.m. and 12 midnight. This association is evident in the modeling results depicted in Table 9-6. As shown, receptors generally located to the east of the facility would experience considerable reductions in operational noise levels under proposed project conditions, as mining moves westward. Conversely, for these same reasons, substantial increases in operational noise levels at receptors generally located south and west of the facility would increase under proposed project conditions. For instance, based on the modeling conducted, receptor number 5 would experience increases in average hourly noise levels of up to approximately 24 dBA, due primarily to mining activities conducted within the Phase 6 expansion area. Noise levels would be greatest during initial extraction and would be anticipated to decrease slightly as the depth of the mining pit increases.

As depicted in Table 9-6, predicted operational noise levels at some receptors that are anticipated to experience noticeable increases in ambient noise levels (i.e., 3 dBA or greater) would exceed the Placer County recommended hourly thresholds of 60 dBA L_{eq} during the daytime hours and/or 50 dBA L_{eq} during the nighttime hours. As indicated in Table 9-6, combined operational noise levels, including both stationary and mobile sources, would range from approximately 57 to 81 dBA L_{eq} at nearby receptors. Because the proposed operational activities would result in noticable increases in ambient noise levels that would exceed the County's recommended noise criteria for land use compatibility, this impact is considered significant.

Impact
9-3

Increase in Operational Highway Traffic Noise. *Predicted noise levels at noise-sensitive receptors located along the existing haul route would exceed the 60 dBA L_{dn} standard. However, the predicted plus project noise levels do not result in an increase in noise levels compared to baseline conditions. As a result, this impact is considered* ***less than significant****.*

As discussed in Chapter 7, Traffic, of this EIR, the proposed project would result in a decrease in average daily heavy truck traffic of 110 trips and an increase in average daily car and light truck traffic of 11 trips under baseline AAPR conditions, resulting in a net decrease of vehicle trips on an average annual basis (DKS 2004). Table 9-7 presents existing and existing plus project predicted traffic noise levels on area roadways for an average day under the AAPR. Existing plus project traffic noise levels in Table 9-7 were calculated using the FHWA Traffic Noise Prediction Model (FHWA 1988). Input variables such as daily traffic volumes, traffic distribution characteristics, vehicle speeds, ground attenuation factors, and roadway widths were based on information from the traffic report prepared for this project, Caltrans, and model settings.

Predicted noise levels 50 feet from the near travel lane centerline of the existing haul route exceed 60 dBA. Based on the comparison between existing and existing plus project traffic noise projections for the average day under the AAPR, the proposed project would result in a net decrease in traffic noise levels along all roadways.

Exhibit 9-6 shows the predicted traffic noise contours within the town of Sheridan for existing plus project conditions for the existing haul route. The noise contours were calculated using the FHWA Highway Traffic Noise Model (TNM) based on the predicted roadway traffic noise levels. TNM allows for the computation of the effects of variations in ground elevations, intervening natural and human-made features, and multiple reflections from various sources (e.g., buildings, soundwalls) using commonly applied acoustic propagation and attenuation methodologies, calibrated against field measurements. TNM is the most current model recommended by the FHWA for the prediction of traffic noise. Input data used in the model included average daily traffic levels for nearby area roadways, day/night percentages of autos, medium and heavy trucks, vehicle speeds, ground attenuation factors, roadway widths, and ground elevation data. Average daily traffic volumes were obtained from the traffic analysis prepared for this project. Vehicle distribution percentages were based on average vehicle distribution and heavy-duty truck distribution percentages obtained from Caltrans and the traffic report.

To account for changes in heavy-duty truck traffic along the haul truck route, vehicle distribution percentages were adjusted based on the maximum estimated project-generated vehicle trip generation rates obtained from the traffic analysis prepared for this project.

Table 9-7
Summary of Existing and Existing Plus Project Predicted Traffic Noise Levels

Roadway Segment	Predicted Traffic Noise Levels and Contours: Average Annual Production Rate (Average Day)				
	CNEL 50 Feet From Near Travel Lane Centerline (dBA)			Distance (Feet) from Roadway Centerline to 60 dBA (CNEL) Noise Contour	
	Existing	Existing plus Project	Net Difference	Existing	Existing plus Project
Riosa Road East of Andressen Road Intersection	64.17	63.24	-0.93	105.7	91.7
Riosa Road West of Andressen Road Intersection (Downtown Sheridan)	64.29	63.39	-0.90	107.7	93.8
Karchner Road Between Porter and Riosa Roads	64.01	63.05	-0.96	103.3	89.1
Camp Far West Road Between Patterson Sand and Gravel Entrance and Porter Road Intersection	64.03	63.07	-0.96	103.4	89.3
SR 65 North of Riosa Road Intersection	74.62	74.59	-0.03	525.3	522.8
SR 65 South of Riosa Road Intersection	74.55	74.33	-0.22	519.7	501.8
SR 65 North of SR 193 Intersection	77.00	76.88	-0.12	756.2	742.7
SR 65 South of SR 193 Intersection	76.69	76.56	-0.13	721.3	707.3

[1] Existing traffic noise levels were calculated using the FHWA Traffic Noise Prediction Model computer program (FHWA 1988). Input variables such as daily traffic volumes, traffic distribution characteristics, vehicle speeds, ground attenuation factors, and roadway widths were based on information from the traffic report prepared for this project, Caltrans, and model settings.

Traffic modeling results are presented in Appendix E.

Source: DKS Associates 2004, EDAW 2004

As stated above, the proposed project would result in an overall decrease in ambient noise levels on area roadways on an annual average basis as compared to baseline conditions; that is, the environmental conditions occurring at the time the latest NOP was published. Because the proposed project would not result in an increase in traffic noise levels that would exceed County noise standards, this impact is considered less than significant. (Please refer to Section 3.5 of this EIR for a discussion of baseline conditions used in this EIR. The project's contribution to cumulative traffic noise impacts are discussed in Section 16.2 of this EIR).

Exhibit 9-6 Predicted Traffic Noise Contours - Existing Plus Project
11x17

11x17 second page

Impact
9-4

<u>Increases in Nighttime Intermittent Single-Event Noise Levels</u>. *Potential increases in nighttime intermittent single-event noise levels from onsite mining operations may result in increased levels of sleep disruption to occupants of residential dwellings located near the mine. As a result, this impact is considered* ***potentially significant.***

In addition to increases in average daily or average hourly noise levels, as discussed in Impacts 9-2 and 9-3, intermittent SELs and increases in the frequency of occurrence of such levels would be of additional concern, particularly during the more noise-sensitive evening and nighttime hours. Although the average daily noise descriptors (i.e., L_{dn} and CNEL) incorporate a nighttime weighting or "penalty," which is intended to reflect the expected increased sensitivity to annoyance at night, these descriptors do not necessarily protect people from sleep disturbance.

Onsite operations would generate intermittent noise levels associated with various activities, including the loading of haul trucks and hoppers, the sounding of backup alarms, and noise generated by processing equipment. Based on noise measurements conducted at the project site and at similar facilities, maximum intermittent noise levels typically associated with the loading of trucks and hoppers can range from approximately 77 to 84 dBA at approximately 40 feet. Noise from backup beepers can reach levels in excess of 90 dBA at 10 feet (EDAW 2002). Truck-generated intermittent noise events are largely associated with brake squeal, backup alarms, and impact noise generated by the haul trailers when traveling over rough or uneven surfaces. Based on noise measurements of haul truck operations obtained from similar operations, intermittent haul truck noise levels, including brake squeal and trailer impact noise, typically range from approximately 85 to 95 dBA L_{max} at approximately 15 feet, for brief periods of time (EDAW 2002).

Backup beepers are exempt from the Placer County Noise Ordinance. Other types of safety devices are available that would result in less intrusive noise levels. However, according to the Occupational Safety and Health Administration (OSHA), these types of devices do not provide the necessary employee protection required by the construction safety and health regulations (CFR Part 1926.601(b)(4)) and thus are usually not approved for use by OSHA.

Intermittent SEL impacts would vary considerably depending on various factors, such as background noise levels, source type, and distance from source to receptor. As discussed above, the proposed project would result in a decrease in average daily heavy truck traffic of 110 trips under average annual production rate conditions (DKS 2004). Thus, the occurrence of intermittent SELs from heavy trucks would be less frequent under plus project conditions along the existing haul route.

Expansion Phases 2–5 are located a similar distance from the sensitive noise receptors as the current mining phases, and the location of the processing plant is not proposed to change; therefore, the SELs associated with most onsite operations would not be anticipated to result in a noticeable change in either the intensity or frequency of occurrence as perceived at the nearest residence. However, SELs from proposed mining/reclamation activities at Phase 6 would be of particular concern, because of the close proximity of Phase 6 to the residences along Camp Far West Road. Based on the noise levels described above, and estimating an attenuation rate of 6 dBA/DD, the nearest residence to Phase 6 could experience SELs that are approximately 10–12 dBA higher than under existing conditions. Such activities would not only result in an increase in noise levels, but also exceed the significance thresholds for the more noise-sensitive hours of the day. As a result, this impact is considered potentially significant.

Impact
9-5

Exposure to Operational Noise Exceeding Applicable Thresholds During Temperature Inversion and Windy Conditions. *Under temperature inversions and windy conditions, noise levels from operational and mining/reclamation activities at the nearby sensitive receptors could exceed applicable thresholds. This impact is considered **potentially significant**.*

Atmospheric conditions in the project vicinity vary considerably from season to season, and this variation affects the propagation of sound. Atmospheric factors that most significantly affect how sound propagates are temperature, relative humidity, wind speed, and direction. Each of these factors are discussed in detail above and in Appendix E.

Based on data obtained from the Beale Air Force Base monitoring station, the prevailing winds in the project area blow from the south at a speed of 9 mph (CARB 1984). High-wind conditions, those exceeding 10 mph, also prevail from the south-southeast direction and occur fewer than 11 percent of the year, on average. Prevailing winds from the north occur less than approximately 8 percent of the year and typically average less than approximately 6 mph. Because residences located in the vicinity of the project site are predominantly located south of the project site and not in the direction of predominant high winds, wind is not considered to contribute substantially to meteorologically induced increases in ambient noise levels attributable to the proposed project. However, the residential dwellings located in the vicinity of the project site, particularly those located to the north of the project site could occasionally experience increases in ambient noise levels because of high wind conditions.

According to CARB data for the 6 years spanning 1992–1997, temperature inversions were present 81 percent of the days analyzed; of those inversions present, approximately 22 percent had a ceiling height of 1,000 feet or less. The greatest percentage of the temperature inversions occur in the summer months of July, August, and September. However, the greatest percentage of temperature inversions that have a ceiling height of 1,000 feet or less occur in the winter months of December, January, and February (CARB 2002). Thus, temperature inversions with the greatest potential to affect sound transmission would occur during the winter months.

As discussed in Impact 9-2, predicted operational noise levels (under normal meteorological conditions) would be anticipated to exceed the Placer County recommended noise thresholds at some nearby receptors (see Table 9-6). Under "worst-case" meteorological conditions, such as temperature inversions or high wind conditions, these predicted operational noise levels, as identified in Table 9-6, may increase by as much as approximately 11 dBA for brief periods of time, depending on ambient conditions and distance from source to receptor. Under these conditions, predicted operational noise levels would likewise exceed the Placer County hourly and/or average daily noise standards. As a result, this impact is considered potentially significant.

9.4 MITIGATION MEASURES

No mitigation measures are required for the following *less-than-significant* impact.

9-3: Increase in Operational Highway Traffic Noise

Mitigation measures are provided below for *significant* and *potentially significant* impacts of the proposed project.

Mitigation Measure R9-1: Implement Measures to Reduce Short-term Construction Noise Levels. The applicant shall implement the following measures:

- Construction operations shall be limited to the hours between 7 a.m. and 7 p.m., Monday through Friday.
- Construction equipment shall be properly maintained and equipped with noise control, such as mufflers and engine shrouds, in accordance with manufacturer specifications.

Mitigation Measure R9-2: Implement Measures to Reduce Operational Mining and Processing Noise Levels. The applicant shall implement the following measures:

a) Mining equipment shall be properly maintained and equipped with noise control devices, such as mufflers and engine shrouds, in accordance with manufacturer specifications.

b) Mining and reclamation operations in Phases 1–6 shall be limited to hours between 7 a.m. and 10 p.m.

c) An earthen landscaped berm shall be constructed on the south and east perimeter of Phase 6.

d) Phase 6 mining shall commence in the northwest portion of this phase.

e) Provide acoustical treatment of residential buildings that would remain significantly impacted by the proposed project after implementation of the noise mitigation measures listed above.

Mitigation Measure R9-4: Implement Measures to Reduce Single-Event Noise Levels. The applicant shall implement Mitigation Measure R9-2, described above, to reduce SEL associated with the proposed project.

Mitigation Measure R9-5: Implement Measures to Reduce Atmospheric Effects. The applicant shall implement Mitigation Measure R9-2, described above, to reduce atmospheric effects of the proposed project.

9.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

<u>Impact 9-1: Short-Term Construction Noise Levels Exceeding Permissible Limits</u>. Implementation of Mitigation Measure R9-1 would reduce potentially significant impacts associated with short-term construction noise to a *less-than-significant* level.

<u>Impact 9-2: Operational Mining and Processing Noise Levels Exceeding Recommended Thresholds.</u> Implementation of Mitigation Measure R9-2 would reduce operational noise levels, such that noticeable increases in ambient noise levels (in comparison to baseline conditions) would not occur at any of the receptors listed in Table 9-8, with the exception of receptor 4. Noise levels with mitigation incorporated are greatly reduced at receptor 4. However, Mitigation Measure R9-2, measures (c) and (d), would not be as effective for this receptor as for other receptors because this receptor's elevated location may still place this residence within the line of sight at times during the mining of Phase 6. Implementation of Mitigation Measure R9-2 would ensure that resultant noise levels at receptors experiencing noticeable increases in ambient noise levels would be below the County's noise criteria for land use compatibility, with the exception of receptor 4 as discussed above. It should be noted that noise levels at some receptors located near the processing plant (i.e., receptors 3 and 10) would continue to experience hourly noise levels in excess of the County's noise criteria. Under baseline conditions, noise levels at these receptors are primarily the result of onsite stationary source noise and haul truck traffic on area roadways. Implementation of the proposed project and Mitigation Measure R9-2 would be predicted to reduce operational noise levels at these receptors. Nevertheless, implementation of Mitigation Measure R9-2 would not reduce all noise levels to below the thresholds of significance; as a result, this impact is considered *significant and unavoidable*.

<u>Impact 9-4: Increases in Nighttime Intermittent Single-Event Noise Levels</u>. Implementation of Mitigation Measure R9-4 would reduce potentially significant impacts associated with nighttime SELs from mining/reclamation activities to a *less-than-significant* level.

<u>Impact 9-5: Exposure to Operational Noise Exceeding Applicable Thresholds During Temperature Inversion and Windy Conditions</u>. Implementation of Mitigation Measure R9-5 would reduce the likelihood that atmospheric effects would increase project-generated noise levels beyond the recommended thresholds. As a result, this impact would be reduced to a *less-than-significant* level.

Table 9-8
Predicted Operational Noise Levels (dBA L_{eq})[1]

Sensitive Receptor #	Baseline	Proposed Project With No Mitigation	Significant Increase Prior to Mitigation?	With Mitigation Measure R9-2(a)	With Mitigation Measure R9-2, Measures (b) Through (d)		Significant Increase After Mitigation [2]	Significance After Mitigation [3]
					Daytime	Nighttime		
1	84.62	60.40	NO	51.62	51.00	49.16	NO	LTS
2	50.40	60.23	YES	49.59	49.59	44.41	NO	LTS
3 [4]	59.17	72.05	YES	61.76	58.36	57.35	NO	LTS
4	56.85	80.59	YES	68.63	64.05	53.47	YES	SU
5	58.27	75.76	YES	64.15	60.21	54.67	NO	LTS
6	69.09	58.80	NO	50.23	49.83	47.95	NO	LTS
7	56.35	57.37	NO	48.38	47.77	45.73	NO	LTS
8	84.62	58.25	NO	49.27	49.27	46.64	NO	LTS
9	58.76	59.25	NO	49.02	49.02	44.73	NO	LTS
10 [4]	55.39	67.64	YES	57.03	54.16	51.91	NO	LTS
11 [4]	51.84	66.31	YES	55.24	52.41	48.73	NO	LTS
12 [4]	51.45	65.62	YES	54.71	52.50	48.72	NO	LTS
13	46.90	57.42	YES	47.03	47.03	42.39	NO	LTS
14	45.50	57.27	YES	46.49	46.49	40.92	NO	LTS
15	45.23	58.54	YES	47.36	47.36	40.37	NO	LTS
16	44.28	57.18	YES	46.15	46.15	40.00	NO	LTS
17	44.07	57.60	YES	46.44	46.44	40.00	NO	LTS
18	41.23	56.54	YES	45.25	45.25	40.00	NO	LTS

[1] Based on the same assumptions outlined in Table 9-6 and typical equipment noise levels at 50 feet with feasible noise control as presented in Table 9-5.

[2] With Implementation of Mitigation Measure R9-2(a) the maximum daytime and nighttime L_{eq} values would be similar. Implementation of R9-2(a) and (b) would result in nighttime reductions due to time restrictions.

[3] It is important to note that predicted increases in ambient noise levels would exceed Placer County's recommended noise criteria for land use compatibility (i.e., 60 dBA L_{eq} [7 a.m.–10 p.m.], 50 dBA L_{eq} [10 p.m.–7 a.m.]), where the level of significance after mitigation is less than significant.

[4] A further reduction was taken for the mitigated noise levels associated with the receptor based on documented noise reduction